CLAIMS :

1. A rotary apparatus adapted to perform as, compressor, pump, motor or an internal combustion engine; said apparatus comprising of two vanes, two hollow cylindrical sleeves, hollow cylindrical liner, cams and associated linkages, couplings, shaft, clutch and braking/locking arrangement; said vanes are fitted on to the curved surface of the sleeves, one vane on each sleeve, such that the vanes are radial to sleeve's curved surface and at one of the ends of each sleeve; said vanes are so fitted that the vane's surface protrudes out of the sleeve's end; said sleeves placed such that their ends, fitted with vanes are placed adjacent, with the vanes angularly displaced; said vanes are displaced from each other by a defined angle at all times; said sleeves so placed that their axis, the one passing through the center of their end surfaces, lay on one line; said surfaces where the vanes are attached on the sleeves, is such that it allows rotation of the adjacent vane and sleeve fitting, about the said axis; said vanes are placed inside a liner; said liner along with the sleeve surface forms an enclosure; said liner's inner surface is contoured along the path traced by vane edge while rotating about the said axis; said inner surface allows rotation of the vanes about the said axis; said vanes divide the said enclosure formed inside the liner into two sealed chambers; said enclosure is sealed from spaces outside the enclosure; said two sleeves, are coupled and uncoupled with a shaft by means of coupling arrangement actuated by cams or other timing devices; said cams or timing devices are dependent on sleeve position; said cams or timing devices actuate said braking/locking arrangements such that each vane is held at a predetermined position alternately, and the vanes are free to rotate through an defined angle alternately; said cams ore timing devices allow both vanes to rotate simultaneously through an predefined angle; said cams or timing devices defines the angle by which the vanes are separated, rotated simultaneously or independently in a pattern as described in the complete specification.

2. A rotary apparatus as claimed in claim 1 in which the vane are so fitted that only one the vane's surface protrudes out of the sleeve's end.

3. A rotary apparatus as claimed in claim 1 in, which the said shaft is external to the sleeves so that the sleeves are not hollow.

4. A rotary apparatus as claimed in claim 1 in, which the said sleeves are driven by or drive a shaft by coupling arrangements through a gearing arrangement.

5. A rotary apparatus as claimed in claim 1 in which the sleeve end surfaces adjacent to each other are provided with sealing elements forming a continuous sealing line around said end surfaces blocking a leakage flow as practically possible.

6. A rotary apparatus as claimed in claim 1 in which said vanes are provided with sealing elements blocking a leakage fluid flow across the vane edges and liner inner surface as practically possible.

7. A rotary apparatus as claimed in claim 1 in which sealing arrangements are placed at the liner and sleeve interface blocking a leakage fluid flow across the said liner and sleeve interface as practically possible.

8. A rotary apparatus as claimed in claim 1 in which said enclosure formed within the liner and vanes is communicated or sealed to spaces outside the enclosure.

9. A rotary apparatus as claimed in claim 8 in which the communicating device or flow regulating devices such as valves, is so placed, operated and, or timed, such that the apparatus be used as a compressor, motor, pump or a metering device.

10. A rotary apparatus as claimed in claim 8 wherein means are provided for addition or removal of heat and, or other forms of energy, between spaces within, outside the said enclosure formed by the liner and vanes.

11. A rotary apparatus as claimed in claim 10 wherein the communicating devices and, or means of energy addition and removal are so placed, operated and, or timed, such that the apparatus be used as a prime mover like an internal combustion engine.

12. A rotary apparatus as substantially as herein described with reference to figures of accompanying drawings.

AMENDED CLAIMS

[received by the International Bureau on 12 February 2004 (12.02.04) ; claim 2 added, remaining claims amended and renumbered. (2 pages)]

1 A sequence of operation of vanes fitted on to two coaxial sleeves, controlled by two cams dependent on vane and sleeve position, in a rotary apparatus adapted to perform as an variable compression ratio/ volumetric ratio rotary internal combustion engine, compressor, pump, metering device, comprising of two identical vanes, two hollow sleeves, hollow liner, cams and associated linkages, couplings/clutch, shaft, and braking/holding arrangement; said cams define a variable initial angular displacement between vanes at the start of sequence, commencing with one vane stationary and other rotating such that on reaching an angle of 360 degrees minus twice the initial angular displacement both vanes rotate together through the said initial angular displacement and the two vanes reach the said initial position with the individual vane's position interchanged, subsequently the previously held vane rotates and previously rotating vane is held stationary until the rotating vane reaches an angle of 360 degrees minus twice the initial angular displacement from the stationary vane and so on continually; said vanes are fitted on to the sleeves, one vane on each sleeve, such that the vanes are radial to sleeve's surface and at one of the ends of each sleeve; said vanes are so fitted that some portion of the vane's surface protrudes out of the sleeve's end; said sleeves placed such that their ends fitted with vanes are placed adjacent with the vanes angularly displaced by a minimum angle which is controlled, varied by said cams; said surfaces where the vanes are attached on the sleeves is such that it allows rotation of the adjacent vane and sleeve fitting about the said coaxial axis of sleeves; said vanes are placed inside a liner; said liner along with the sleeve surface forms an enclosure; said liner's inner surface is contoured along the path traced by vane edge while rotating about the said axis, thus allowing rotation of the vanes about the said axis; said vanes divide the said enclosure formed inside the liner into two chambers; said two sleeves, are coupled and uncoupled with a shaft by means of coupling/clutching arrangement actuated by cams; said cams are placed on and, or driven by, the sleeves; said braking arrangements actuated by cams or holding arrangement maintain vanes stationary at a controlled but variable position alternately; said cams defines the angle by which the vanes are held stationary, separated, rotated simultaneously or independently in a pattern as described in the complete specification.

2 A rotary apparatus as claimed in claim 1 in which the vane rotating sequence is defined and achieved by timing devices other than cams.

3 A rotary apparatus as claimed in claim 1 in which the vanes are so fitted that only one vane's surface protrudes out of the sleeve's end.

4 A rotary apparatus as claimed in claim 1 in, which the said shaft is external to the sleeves so that the sleeves either be or not be hallow.

5 A rotary apparatus as claimed in claim 1 in which said sleeves are driven by, or drive a shaft through a gearing or similar arrangement.

6 A rotary apparatus as claimed in claim 1 in which the sleeve end surfaces adjacent to each other are provided with sealing elements forming a sealing line around said end surfaces blocking a leakage flow as practically possible.

7 A rotary apparatus as claimed in claim 1 in which said vanes are provided with sealing elements blocking a leakage fluid flow across the vane edges, as practically possible.

8 A rotary apparatus as claimed in claim 1 in which the liner and sleeve interface is provided with sealing elements blocking a leakage fluid flow across the said liner and sleeve interface, as practically possible.

9 A rotary apparatus as claimed in claim 1wherein communicating devices or flow-regulating devices such as ports or valves are provided with, such that the said enclosure is communicated or sealed to spaces outside the enclosure.

10 A rotary apparatus as claimed in claim 9 in which the communicating device or flow regulating devices such as valves, is so placed, operated and, or timed, such that the apparatus be used as a compressor, motor, pump or a metering device.

11 A rotary apparatus as claimed in claim 9 wherein means are provided for addition or removal of heat and, or other forms of energy, between spaces within, outside the said enclosure formed by the liner and vanes.

12 A rotary apparatus as claimed in claim 11 in which communicating devices and, or means of energy addition and removal are so placed, operated and, or timed, such that the apparatus be used as a prime mover like an internal combustion engine.

13 A rotary apparatus as substantially as herein described with reference to figures of accompanying drawing.

STATEMENT UNDER ARTICLE 19 (1)

[Where originally there were 12 claims and after amendment of claims and adding a new claim, there are 13] "Claim1 replaced by amended claim bearing same number; new claim 2 added; original claim 2 renumbered as 3; original Claim 3 amended and renumbered 4; original claim 4 amended and renumbered as 5; original claim 5 amended and renumbered as 6; original claim 6 amended and renumbered as 7; original claim 7 amended and renumbered as 8; original claim 8 amended and renumbered as 9;original claims 9 and 10 which referred to claim 8 now renumbered 10 and 11 and refer to claim 9; original claim 11 which referred to claim 10 now renumbered 12 refers to claim 11; original claim12 renumbered as 13."